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The Polyporaceae of North America — XIII. The described species of Bjerkandera, Trametes, and Coriolus

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In article XII of this series the above genera were listed and described in their proper order, but the species were omitted for lack of space. The present paper deals with the published species only of these three genera.

BJERKANDERA Karst. Medd. Soc. Faun. et Fl. Fenn. 5: 38. 1879

Merisma Gill. Champ. Fr. 1: 688. 1878. Not *Merisma* Persoon.

Myriadoporus Peck, Bull. Torrey Club 11: 27. 1884.

This genus was based on *Bjerkandera adusta* (Fr.) and six other species, and described as follows:

"Receptaculum pileatum, sessile, carnoso-lentum, molle, elasticum, anodermeum. Pileus azonus. Hymenium heterogeneum. Pori colorati, integri."

Merisma of Gillet was based on *Merisma imberbe* (Bull.) and twelve other species. The name had been previously used by different authors for groups of fungi in which the sporophore was branched. Persoon used it for a group of the *Clavariaceae*.

Myriadoporus of Peck was founded upon *Myriadoporus adustus* Peck, which is only an abnormal form of *Bjerkandera adusta* (Willd.) Karst., and hence a synonym.

Synopsis of the North American species

1. Hymenium smoke-colored when very young, becoming black with age. 1. *B. adusta*.

Hymenium pallid when very young, becoming more or less smoke-colored with age. 2.

[The BULLETIN for November (32: 563–632, *pl. 23–29*) was issued 6 D 1905.]

2. Tubes round, equal and rather thick-walled at maturity, becoming lacerate only with age; plant not fragrant. 2. *B. fumosa.*

Tubes angular, unequal and thin-walled at maturity; plant fragrant. 3. *B. fragrans.*

1. BJERKANDERA ADUSTA (Willd.) Karst.

Boletus adustus Willd. Fl. Berol. 392. 1787.
Boletus fuscoporus Plan. Pl. Erf. 26. 1788.
Boletus suberosus Batsch, Elench. Fung. *pl. 226.* 1789.
Boletus pelleporus Bull. Herb. Fr. **11**: *pl. 501. f. 2.* 1790.
Boletus carpineus Sowerby, Eng. Fung. *pl. 231.* 1799.
Boletus adustus crispus Pers. Obs. Myc. **2**: 8. 1799.
Polyporus crispus Fr. Obs. Myc. **1**: 127. 1815.
Boletus isabellinus Schw. Syn. Fung. Car. 70. 1818.
Polyporus adustus Fr. Syst. Myc. **1**: 363. 1821.
Polyporus subcinereus Berk. Ann. Mag. Nat. Hist. **3**: 391. 1839.
Polyporus Halesiae B. & C. Ann. Mag. Nat. Hist. II. **12**: 434. 1853. — Grevillea **1**: 52. 1872.
Bjerkandera adusta Karst. Medd. Soc. Faun. et Fl. Fenn. **5**: 38. 1879.
Myriadoporus adustus Peck, Bull. Torrey Club **11**: 27. 1884.
Polyporus Burtii Peck, Bull. Torrey Club **24**: 146. 1897.

The history of this fungus has been that of most of our abundant, widespread and variable species: it has been named and renamed again and again in various countries by mycologists not in touch with each other and not conversant with the work already done, until, with types gone and data lost, it seems wellnigh impossible to follow the various specific and varietal names with exactness. The above list, however, while not complete, represents fairly well the best known synonyms since Willdenow first described it in 1787.

Four or more new names have been given the plant in this country from the days of Schweinitz to the present time. Berkeley's name, *P. subcinereus*, assigned to plants collected at Carlton House by Richardson, was corrected by Montagne and the correction accepted by Berkeley. *P. Halesiae*, described from plants collected by Ravenel on *Halesia tetraptera* in Georgia, is acknowledged by the authors to be allied to *P. crispus*, but claimed to be distinct. *P. crispus* itself was without sufficient reason raised to

specific rank from the varietal distinction accorded it by Persoon. In describing *P. Burtii* from plants collected on birch in Vermont, Peck says "This fungus is closely allied to *Polyporus adustus*, of which it might easily be considered a mere variety."

The pallid pileus and small-pored, dark hymenium, which looks as though it had been too near to a forest fire, are well known to most collectors. In its resupinate forms it is not easily distinguished from *P. dichrous* and from *Gloeoporus conchoides*. The spores are smooth, hyaline, ellipsoid-allantoid, 3–5 × 1.5–2.5 μ. Specimens are abundant on all kinds of dead deciduous wood and only representative ones will be listed here in order to show the wide range of the species:

Germany, *Magnus;* Hungary, *Dietz;* Sweden, *Murrill;* England, *Murrill;* Canada, *Macoun;* Maine, *Miss White, Ricker, Murrill;* Connecticut, *Miss White;* New York, *Burnham, Earle;* New Jersey, *Ellis, Murrill;* Delaware, *Commons;* Pennsylvania, *Banker, Sumstine;* Virginia, *Murrill;* North Carolina, *Memminger;* Georgia, *Harper;* Tennessee, *Murrill;* Florida, *Lloyd;* Alabama, *Earle;* Louisiana, *Langlois;* Ohio, *Morgan;* Missouri, *Glatfelter;* Kansas, *Bartholomew;* Oregon, *Carpenter.*

2. BJERKANDERA FUMOSA (Pers.) Karst.

Boletus fumosus Pers. Syn. 530. 1801.
Polyporus fumosus Fr. Obs. Myc. **2**: 257. 1818.
Bjerkandera fumosa Karst. Medd. Soc. Faun. et Fl. Fenn. **5**: 38. 1879.

This species appears to be fairly common throughout temperate regions on various forms of deciduous wood. Those who consider *Boletus imberbis* Bull., *Polyporus holmiensis* Fr. and *Polyporus salignus* Fr. forms of this species would undoubtedly include *Polyporus fragrans* Peck in the same category. The typical plant has round regular pores, more or less smoky, especially when bruised, and usually splitting with age. Among the numerous foreign and American specimens, the following may be mentioned:

Austria, *Bresadola;* Scotland, *Berkeley;* England, *Plowright;* Canada, *Macoun, Dearness;* New York, *Shear;* New Jersey, *Murrill;* Pennsylvania, *Everhart, Sumstine;* Delaware, *Commons;* Virginia, *Murrill;* Ohio, *Morgan;* Kansas, *Bartholomew;* Mis-

souri, *Demetrio;* Iowa, *Holway;* Nebraska, *Webber;* Montana, *Anderson.*

3. **Bjerkandera fragrans** (Peck)

Polyporus fragrans Peck, Rep. N. Y. State Mus. **30**: 45. 1878.

Described from specimens collected on decaying trunks of elm trees near Bethlehem, New York, in October. The following note is appended to the description: "This species is closely related to *P. adustus* and *P. fumosus*, from which it is readily separated by the unequal pores. Its odor when fresh is very decided and quite agreeable, being not much unlike that of dry Seneca grass."

In a later report Peck says: "After heavy rains this fungus has a moist brownish appearance tinged slightly with dull red, and is obscurely zonate. It is paler when dry and sometimes slightly spotted. It is very closely allied to *P. fumosus*, and perhaps ought to be considered a mere variety of it. It is distinguished by its agreeable odor and by the thinner and sometimes lacerated dissepiments of its more unequal and angular pores."

Since Peck first described it, specimens have been collected on several other deciduous hosts beside elm and in many other states beside New York and Vermont, as the following will show: Canada, *Macoun, Dearness;* Vermont, *Morgan, Brainerd;* New York, *Peck, Cook, Miss Overacker;* New Jersey, *Cardiff;* Kansas, *Swingle, Cragin, Bartholomew;* Missouri, *Demetrio;* Wisconsin, *Baker;* Nebraska, *Webber;* Michigan, *Langdon.*

SPECIES INQUIRENDAE

POLYPORUS TEREBRANS B. & C. Jour. Linn. Soc. Bot. **10**: 306. 1868. Collected by Wright on dead trees in Cuba and thus described:

"Pileo subcarnoso, crasso, convexo, flabelliformi, luteo, pubescenti-scabro; stipite crasso lateraliter compresso, matrici pro magna parte, immerso, pubescente; pileo concolore; hymenio convexo, albido; poris parvis, acie obtusis.

"Pileus 1½ inch long, 1¾ wide; stem ¾ inch long and thick; pores $\frac{1}{6}$ inch across, probably much contracted."

Only one poor specimen is to be found at Kew, which resembles *Piptoporus suberosus* in general form. The stipe appears abnormal as though the result of an effort on the part of the sporophore to escape from the substratum. The hymenium is now quite dark in color.

POLYPORUS ALBOSTYGIUS B. & C. Jour. Linn. Soc. Bot. **10**: 309. 1868. Described from plants collected by Wright on dead wood in Cuba as follows:

"Pileo e resupinato breviter reflexo tomentoso pallido, margine pulvinato; hymenio nigro; poris minimis punctiformibus intus contextuque albis."

"Pileus with pores 2 lines thick; pores 1/180 inch in diameter, angular under a high magnifier. A very curious species."

The type specimens at Kew are white above and within, while the mouths of the tubes are very black. The name is well chosen.

TRAMETES Fr. Gen. Hym. 11. 1836

This genus was established upon *Polyporus suaveolens* and its allies, constituting one group, and *Daedalea gibbosa*, *D. elegans*, *D. rubescens*, etc., constituting a second subdivision. *Polyporus suaveolens* is the type. The genus is characterized by Fries as follows:

"Hymenophorum omnino immutatum et cum pilei substantia concolor inter poros descendit. Pori rotundati aut lineares, acie crassa et obtusa distincti, simplices, integerrimi, numquam laceri. Pileus suberosus."

Synopsis of the North American species

Pores small, round, thick-walled; plant white, very fragrant, only slightly yellowish on drying. 1. *T. odora*.

Pores much larger, 5 to 10 to a cm., angular, thin-walled; plant not fragrant, deep fawn-colored when dry. 2. *T. unicolor*.

1. TRAMETES ODORA (Sommerf.) Fr.

Polyporus odorus Sommerf. Suppl. Fl. Lap. 275. 1826. — Fr. Elench. Fung. 90. 1828.

Trametes odora Fr. Epicr. 491. 1838.

Daedalea puberula B. & C. Grevillea **1**: 67. 1872.

This species was first described from Lapland as follows:

"Dimidiatus irregularisque, pileo glabro pallescente, poris rotundis albido-ochraceis. *Boletus* L. Fl. Lap. no. 522. In Salicibus Nordlandiae saltensis."

"Odore pergrato et forti aniseo memorabilis. Interstitia pororum lacerata apparebant, pori tamen integri rotundi."

The circumstances under which this species was established are not satisfactory. The author had young, poorly developed specimens, and he acknowledges that Linnaeus' plant, *B. suaveolens*, was unknown to him, hence he, as well as Linnaeus, may have confounded the two species. However, specimens sent by him to Fries were considered distinct and his name was taken up

as a varietal name under *P. suaveolens* in the Elenchus. Other contemporary botanists seem to have concurred in this view of the matter.

The species is certainly very near to *P. suaveolens* and was considered the same by Linnaeus. It has been reported only on willow from the northern parts of Europe and Asia. On comparing North American plants collected on willow with specimens at Kew and other foreign herbaria, it appears that they are all *T. odora*, differing from the Southern European species in being at first pubescent and at length smooth, with minor differences in context and pores. From what we know of distribution in the northern hemisphere, we should expect to find the more northerly species continuous around the globe.

Very few specimens are to be found in the herbarium here, although the plant is certainly not rare on willow in this country and its appearance is well known to most collectors. The following specimens are at hand: Maine, *Harvey;* New Hampshire, *Wilson;* Vermont, *Burt;* New York, *Underwood, Shear, Banker, Peck;* New Jersey, *Ellis;* Pennsylvania, *Gentry.* Accompanying the specimens collected recently by Banker was the following excellent field diagnosis:

"Odor of anise. First growing from the side of standing and then from fallen dead willow. In each case hymenium horizontal. Plant dimidiate, sessile, spreading to some extent beneath the prostrate log. Whitish throughout, becoming gray with age. Upper surface pubescent. Substance solid, tough, subwatery, elastic, resembling somewhat *Piptoporus suberosus;* stratified, the new growth continuous from the upper side of pileus around margin and over the hymenium. In old specimens these layers can be peeled off as in an onion."

2. **Trametes unicolor** (Schw.)

Boletus unicolor Schw. Syn. Fung. Car. 71. 1818.
Polyporus unicolor Fr. Epicr. 458. 1838.
Polyporus obtusus Berk. Ann. Mag. Nat. Hist. **3**: 390. 1839.

This species was collected in quantity on the trunks of living trees in North Carolina and described by Schweinitz very fully. According to him it is always to be found about half way up the

trunk. I have found it in this position quite frequently on the trunks of shade trees in Washington, D. C.

Berkeley's description was taken from specimens in the Hooker herbarium collected in North America by Drummond and labeled *P. Drummondii* by Klotzsch. Comparison of the type specimens at Kew and Philadelphia shows the two species *P. unicolor* and *P. obtusus* to be synonymous. Either name is a very suitable one.

This is a large and conspicuous plant, but rather hard to collect on account of its arboreal habit. It has been found on dead or partly decaying living trunks of oak, maple and a few other deciduous trees. The pileus is quite soft and elastic when young and the tubes are very long and become somewhat daedaleoid by confluence as they grow older. Although abundant and well known in some localities, the species has not been often reported: New Jersey, *Ellis, Meschutt;* Maryland, *Maxon;* District of Columbia, *Murrill;* Virginia, *Murrill;* North Carolina, *Schweinitz;* Missouri, *Demetrio;* Iowa, *Holway;* Wisconsin, *Baker.*

SPECIES INQUIRENDAE

SISTOTREMA SPONGIOSUM Schw. Syn. Fung. Car. 75. 1818. *Polyporus labyrinthicus* Fr. Elench. Fung. 83. 1828. Described from North Carolina plants collected on living or recently fallen trunks. Discussed at some length by Fries, who received specimens from Schweinitz. In their commentary, Berkeley and Curtis say it is remarkable for its coarse, tow-like texture, but they do not associate it with any better known name or species.

There are many reasons for believing this species to be a near ally of *P. unicolor.* All the descriptions point to an old specimen of this latter plant in which the tubes have become quite daedaleoid and the dissepiments broken up. A sheet of specimens at Kew labeled *P. labyrinthicus* from Plowright's herbarium shows well the characters of *P. unicolor.* They may not be authentic, however, though they seem old enough to be so considered. On the same sheet at the bottom are the specimens of *P. leucospongia* sent from Harkness with their original label, *P. labyrinthicus*, just as he sent them. These are the cause of the confusion of the two species, as we see it in Saccardo's Sylloge, for example.

POLYPORUS TOMENTOSO-QUERCINUS Johnson, Bull. Minn. Acad. Nat. Sci. **1**: 338. 1878. Described from the author's collections in Minnesota as follows:

"Pileus at first soft, compact, spongy, tomentose, pulvinate, dimidiate, sessile, very thick, divergently fibrous within, broad surface of attachment, dirty grayish white when young, pale straw or subferruginous when old, hard, coriaceous, woody at maturity; pores large, irregular, toothed or fringed, easily separated, from ¾ to 1 inch long, varying in color from straw to bright orange."

"Nearly always on the north side of living oaks. Pileus 1 to 2 inches thick, 2 to 5 inches broad. Spores numerous, white, globose, very small. Drops its spores in May or early June. Plant is persistent, lasting the whole year. * * * Very scarce, only seen occasionally."

The above description applies very well to the western form of *Trametes unicolor*. It is necessary, however, to see the type plants before definitely connecting the two forms.

CORIOLUS Quél. Ench. Fung. 175. 1886

Hansenia Karst. Medd. Soc. Faun. et Fl. Fenn. **5**: 39. 1879. Not *Hansenia* Turcz. 1844.

The genus *Hansenia* was founded upon *Hansenia hirsuta* (Wulf), with seventeen additional species, and thus described:

"Receptaculum pileatum, dimidiatum, sessile, primitus aridum et firmum. Pileus cuticula tenui, fibrosa, coriaceus, villosus, zonatus, contextu floccoso, tenaci. Hymenium homogeneum. Pori trama pilei distincti ejusque substantiae verticaliter oppositi, subrotundi."

Unfortunately, the name *Hansenia* had been proposed by Turczaninow as early as 1844 (Bull. Soc. Nat. Mosc. **17**: 754) for a genus of the *Umbelliferae* and is consequently ineligible, leaving the vacancy to be filled by *Coriolus* of Quélet, founded upon *Polyporus zonatus* Fr. and seven other species, with the following description:

"Pileus villosus, zonis concentricis, vulgo discoloribus, fasciatus. Spora oblonga, alba. Lignatiles."

Polyporus lutescens Pers., the first species listed by Quélet under *Coriolus*, is accompanied by the citation of a figure, but this citation was but doubtfully given by Persoon in the original description and the recent investigations of Bresadola, who has examined Persoon's types, do not tend to confirm Quélet's opinion. The type of *Coriolus*, therefore, is *P. zonatus*, the first species accompanied by a correct citation of a figure.

The species of this genus are mostly thin, dry plants with a

more or less zonate surface, which may be glabrous or variously adorned with hairs. White or yellowish colors prevail for both surface and context, only a few species showing light-brown or gray tints. The hymenium becomes wholly or partially fuscous in a few species, but it is generally white. The tubes are small and delicate, often breaking up with age. In some species there is an early fission of the dissepiments and the hymenium becomes irpiciform, as in the very common *Coriolus pargamenus*.

Work in this entire group has been rendered exceedingly difficult by the large number of "new species" published independently in former years from three or four European centers of research, each ignoring the existence of the rest. In the case of the present genus, these brief early descriptions are entirely inadequate and the poorly preserved type plants, when they exist at all, often fail to supplement them sufficiently.

Add to this the host of incorrect determinations found in the literature then current, the wholesale assignment of foreign names to plants exclusively American, and the glittering array of species in important herbaria combined under one name, and the systematist confronts a set of conditions unusually stringent where plants naturally closely allied are to be distinguished and new species described.

Synopsis of the North American species

1. Tubes more or less entire, at least until the sporophore is quite old. 2.
   Tubes soon breaking up into long irpiciform teeth. 24.
2. Surface of pileus wholly or partly glabrous when mature or clothed only with inconspicuous hairs. 3.
   Surface of pileus clothed entirely with a very conspicuous hairy covering. 18.
3. Pileus not entirely glabrous at maturity. 4.
   Pileus entirely glabrous at maturity. 10.
4. Pileus marked at maturity with glabrous zones of a different color from the rest of the surface. 5.
   Pileus not marked with glabrous zones, but nearly uniform in color and not shining. 9.
5. Glabrous zones large, numerous, conspicuously and variously colored. 1. *C. versicolor*.
   Glabrous zones small and comparatively inconspicuous. 6.
6. Surface villose between the zones, which are late in appearing; plants small, 1–2 cm. in diameter. 2. *C. hirsutulus*.
   Surface minutely pubescent or tomentose between the zones; plants usually much larger. 7.
7. Hymenium white or yellowish. 8.
   Hymenium fuscous. 3. *C. floridanus*.

8. Tubes small, 5 to a mm., and perfectly regular and entire. 4. *C. ectypus.*
Tubes twice as large, often irregular from splitting; glabrous zones late in appearing and sometimes absent. 5. *C. pubescens.*
9. Sporophore semiresupinate, shortly reflexed, tubes 1 cm. or more in length. 6. *C. subluteus.*
Sporophore wholly pileate, tubes less than 1 cm. in length. 7. *C. Sartwellii.*
10. Plants white or very light-colored. 11.
Plants more or less gray or brown. 16.
11. Hymenium lilac-colored, often faded in herbarium specimens. 8. *C. brachypus.*
Hymenium white or yellowish. 12.
12. Margin of pileus entire or lobed, not becoming fimbriate or lacerate. 13.
Margin of pileus very thin, becoming fimbriate or lacerate at maturity. 14.
13. Sporophore extremely thin and very flexible, with only one or two, if any, shining zones. 9. *C. haedinus.*
Sporophore thicker and quite rigid, with several shining zones. 10. *C. ilicincola.*
14. Tubes large, 2–3 to a mm., margin fimbriate. 11. *C. Drummondii.*
Tubes only half as large, margin lacerate. 15.
15. Sporophore dimidiate. 12. *C. membranaceus.*
Sporophore elongated, spatulate. 13. *C. Flabellum.*
16. Pileus marked with brown and black zones; temperate species. 14. *C. planellus.*
Pileus marked with brown and tawny zones; tropical species. 17.
17. Tubes 5 to a mm.; pileus 5 cm. broad, pale tawny, with darker brown zones; velvety zones present in young stages seem soon to disappear. 15. *C. armenicolor.*
Tubes 3 to a mm.; pileus 3 cm. broad, umbrinous-cinereous, subzonate. 16. *C. sobrius.*
18. Pileus 0.5 cm. or more in thickness and several centimeters wide. 19.
Pileus much thinner. 20.
19. Dissepiments obtuse, margin broadly sterile below. 17. *C. nigromarginatus.*
Dissepiments acute, margin but slightly sterile below. 18. *C. Sullivantii.*
20. Hymenium becoming wholly or partly fuscous, tubes broad and very shallow. 21.
Hymenium not becoming fuscous. 22.
21. Tubes regular in shape and size; plant tropical. 19. *C. pinsitus.*
Tubes irregular both in shape and size; plant confined to the southern United States. 20. *C. sericeohirsutus.*
22. Tubes large, 2–3 to a mm. 23.
Tubes small, 5 to a mm. 21. *C. arenicolor.*
23. Edges of tubes entire. 22. *C. hirtellus.*
Edges of tubes thin, serrate. 23. *C. tener.*
24. Plants large, 6–20 cm. wide and about 1 cm. in thickness. 24. *C. biformis.*
Plants much smaller and always very thin. 25.
25. Surface ashy-white, villose; plant confined to coniferous wood. 25. *C. abietinus.*
Surface wood-colored, tomentose; plant found on both deciduous and coniferous wood. 26. *C. pargamenus.*

1. CORIOLUS VERSICOLOR (L.) Quél.

Boletus versicolor L. Sp. Pl. 1176. 1753.
Polyporus versicolor Fr. Syst. Myc. 1: 368. 1821.

Polystictus azureus Fr. Nov. Symb. 93. 1851.
Coriolus versicolor Quél. Ench. Fung. 175. 1886.

Described originally by Haller from plants collected in Switzerland. Several other specific names have been given to European forms which need not be mentioned here. *P. azureus* was assigned by Fries to a thin, beautifully colored form collected at Mirador, Mexico, by Liebmann. It is no more distinct than a dozen other forms which might be mentioned and should receive similar treatment with them.

This species is cosmopolitan and exceedingly abundant on all forms of dead deciduous wood. Although numerous variations occur in its wide range, some of them sufficiently distinct, it seems, for specific rank, still the difficulty of going through the large accumulations of material from all lands in the different herbaria and satisfactorily separating it into groups is so great that it will probably not soon be attempted, especially since the species is so well defined by definite and easily observed characters.

Specimens have been examined from many widely different localities. Living plants have been observed throughout Europe and various parts of the United States. It is needless to attempt here a summary of collections at hand.

2. **Coriolus hirsutulus** (Schw.)

Polyporus hirsutulus Schw. Trans. Am. Phil. Soc. **4**: 156. 1834.

Described from plants collected at Bethlehem, Pennsylvania, on trunks of trees, as follows:

"P. minutus, dimidiatus aut reniformis, subinfundibuliformis etiam; substipitatus, coriaceus, ½ uncialis. Pileo strigoso-canescente griseo, fasciis notato ex pilis setosis, fuligineo-nigris, aggregatis in centro et in margine inflexo, inde ciliato. Poris pallidis subdecurrentibus."

This species is rather common on dead branches of *Sassafras* and is found more rarely on other forms of deciduous wood. One collection of it has been made also on white cedar. Authentic plants may still be seen in the Schweinitz herbarium. They resemble young sporophores of *C. versicolor* in which the zones have just begun to appear, but they are quite distinct from this species and more nearly allied to depauperate forms of *C. nigromarginatus*. The limits of the species need to be better understood. *Polystictus Fibula* Fr. is a close ally.

Material is at hand from Canada, *Macoun;* Connecticut, *Earle;* New York, *Earle;* Pennsylvania, *Michener;* New Jersey, *Ellis;* Ohio, *James, Morgan.*

3. CORIOLUS FLORIDANUS (Berk.) Pat.

Polyporus floridanus Berk. Ann. Mag. Nat. Hist. **10**: 376. 1843.
Polystictus Oniscus Fr. Nov. Symb. 82. 1851.
Coriolus floridanus Pat. Tax. Hymén. 94. 1900.

Described by Berkeley from specimens collected on decaying deciduous trunks in Florida. Described from Mexico and South Carolina by Fries in 1841, but not published until ten years later. Although Fries considered his plant distinct from Berkeley's, they cover the same territory and appear difficult to separate specifically.

This species occurs on oak logs and other deciduous wood in the southern United States from South Carolina to Florida and along the Gulf of Mexico to Texas. It much resembles *C. pargamenus* both in form and habit, but is readily distinguished by its grayish slate-colored surface and smoky hymenium. In some foreign herbaria it is confused with *Polystictus Friesii* Kl., a related species described from tropical America.

Specimens are at hand from South Carolina, *Ravenel;* Florida, *Ravenel, Martin, Lloyd, Small & Carter 1324, E. G. Britton 445;* Louisiana, *Langlois*; Texas, *Ravenel.*

4. CORIOLUS ECTYPUS (B. & C.) Pat.

Polyporus ectypus B. & C. Grevillea **1**: 52. 1872.
Coriolus ectypus Pat. Tax. Hymén. 94. 1900.

The type plants of this species were collected by Ravenel in South Carolina. It has since been found in other parts of the southeastern United States on decayed deciduous wood of various kinds. The following field notes made by Calkins in Florida are of interest as supplementing the rather brief published description:

"Tough, coriaceous, elastic, nearly plane, yellowish and nearly smooth above and multizonate with concentric, very shallow zones; 3–4 inches across, ¼ inch thick, margin acute, sterile beneath. Pores pallid-white changing to yellowish, especially around the margin, small, round, or in places distinctly sinuous, with a changeable luster, even on the surface and not at all lacer-

ate, 2–3 millimeters long. Smell acid; plant somewhat juicy and moist when fresh."

Specimens are at hand from South Carolina, *Ravenel;* Georgia, *Ravenel;* Florida, *Rau, Martin, Calkins;* Louisiana, *Langlois.*

5. **Coriolus pubescens** (Schum.)

Boletus pubescens Schum. Enum. Pl. Saell. **2**: 384. 1803.
Polyporus pubescens Fr. Obs. Myc. **1**: 126. 1815.
Leptoporus pubescens Pat. Tax. Hymén. 84. 1900.

Originally described, from plants collected on white birch in Sweden in midsummer, as follows:

"Cespitosus, imbricatus, pileo carnoso-suberoso, pulvinato, pubescenti, sericeo, albo, undulato-tuberculoso, margineque acuto luteo subferrugineo subzonato; subtus planus albido-pallescens: poris minutis marginem versus evanescentibus: tubulis brevibus. Caro alba. Pileus 1½–2½ poll. latus, 2–3 lin. crassus."

The margin of the American plant is usually more abrupt than that of the European, but the two agree too closely to allow of specific separation. Our plant has been distributed as a variety by Ellis, who at first gave the name of the collector to plants brought from Michigan in 1881 by J. B. Gray, thinking he had a new species. Upon the advice of Cooke, however, the name was reduced to varietal rank before distribution. So far as I know, no description has been published by Ellis either of the species or the variety.

This same plant was collected in Ohio and determined by Morgan as *P. molliusculus* Berk. The Berlin "type" of *P. molliusculus* is from Morgan. Kellerman, following Morgan, has recently distributed the present species under the name of *Polystictus molliusculus* Berk., with a printed description evidently not in accord with the specimens.

This species is very common in the northern United States and Canada on decaying wood of birch, beech, alder, willow, poplar, etc. Dearness found it abundant on rotten beech trunks at London, Canada, but the sporophores were mostly eaten to the bark by squirrels. Material is at hand from the following American localities:

Canada, *Macoun, Dearness;* Maine, *Ricker, Murrill;* Vermont, *Burt;* Massachusetts, *Blake;* New York, *Shear, Peck, Under-*

wood, Maxon & House; Ohio, *James, Lloyd, Kellerman;* Iowa, *Holway, Macbride;* Wisconsin, *Baker;* Michigan, *J. B. Gray.*

6. **Coriolus subluteus** (Ell. & Ev.)

Polyporus subluteus Ell. & Ev. Am. Nat. **31**: 339. 1897.

Described from plants collected by Dearness on old beech trunks in Canada as follows:

"Effused; pileus white, with short tomentum, azonate, subimbricate, margin obtuse, context soft and flexible, upper margin more or less reflexed; pores subcolliculose, unequal, round or subsinuous, ⅓–¾ mm. in diameter, ¾–1 cm. long, subluteous when dry, white inside, margin subdentate, dissepiments thin, context white, not fibrous; spores oblong, very slightly pointed, white, 4–6 × 1½–2 μ."

The type collection of this species is now in the herbarium of the New York Botanical Garden. Too little is known of the plant to be sure that it is not an overgrown resupinate form of some other species.

7. **Coriolus Sartwellii** (B. & C.)

Polyporus Sartwellii B. & C. Grevillea **1**: 51. 1872.

Described from plants collected on trunks in New York by Sartwell. Specimens from New England collected by Sprague were also at hand. There is in the Ellis collection a box of plants collected at Potsdam, New York, in January, 1861, which agree perfectly with the types of *P. Sartwellii* now at Kew. These plants grew on hemlock logs. Specimens collected by Underwood on pine at Centerville, New York, in April, 1887, appear to be specifically identical and show the hymenium to be yellowish instead of black, as in the description, becoming dull-brown with age. Nothing further is known of the species unless Léveillé's brief description of *Polyporus subflavus* (Ann. Sci. Nat. Bot. III. **5**: 300. 1846), collected on trunks in New York by Sallé, refers to the same plant; and this is quite improbable.

8. **Coriolus brachypus** (Lév.)

Polyporus brachypus Lév. Ann. Sci. Nat. Bot. III. **5**: 127. 1846.
Polyporus albo-cervinus Berk. Hook. Jour. Bot. **8**: 234. 1856.
Coriolus albo-cervinus Pat. Tax. Hymén. 94. 1900.

This species was first described from plants collected on trunks in Guadeloupe by L'Herminier. Berkeley's name was assigned to specimens from Panuré, Brazil, collected by Spruce. He remarks

that it differs from *Polystictus Didrichsenii* Fr. (Nov. Symb. 76. 1851), found on the island of Bora-Bora, in its far smaller pores.

The present species is easily known by reason of its beautiful lilac-colored hymenium. It is quite well distributed in tropical America on decayed hardwood trunks.

Surinam, *James;* Brazil, *Spruce;* Nicaragua, *C. L. Smith;* Honduras, *Wilson 179, 560, 670;* Porto Rico, *Wilson 202;* Florida, *Bertolet, Britton 449.*

9. CORIOLUS HAEDINUS (Berk.) Pat.

Polyporus haedinus Berk. Hook. Jour. Bot. **8**: 234. 1856.
Polyporus undigerus B. & C. Jour. Linn. Soc. Bot. **10**: 317. 1868.
Coriolus haedinus Pat. Tax. Hymén. 94. 1900.

Described as follows from Panuré, Brazil, collected on decaying trunks by Spruce:

"Albus, suborbicularis, postice decurrens, tenuis, papyraceus; pileo subtiliter pubescente sulcato-zonato; hymenio concolori; poris angulatis minutis; dissepimentis tenuibus."

"An elegant species, allied to *P. hirsutus*, but much thinner, with finer pores and destitute of distinct hairs."

Twelve years later, Berkeley described the same plant from Cuba under another name, using almost the same words.

10. **Coriolus ilicincola** (B. & C.)

Polyporus ilicincola B. &. C. Grevillea **1**: 52. 1872.

Described from specimens collected by Peters in Alabama on the bark of *Ilex opaca.* The types at Kew are not well preserved. Specimens in the Ellis collection agree in all respects except the sinuate pores.

11. CORIOLUS DRUMMONDII (Kl.) Pat.

Polyporus Drummondii Kl. Linnaea **8**: 487. 1833.
Coriolus Drummondii Pat. Tax. Hymén. 94. 1900.

The type plants were collected by Drummond on trunks near New Orleans, Louisiana. Klotzsch saw them in Hooker's herbarium. They are now in a fair state of preservation at Kew. The plant has not since been collected in Louisiana and I have not seen anything closely resembling it in recent collections from the southern United States.

Specimens collected in Brazil by Möller are referred to this species by Bresadola (Hedwigia **35**: 281. 1896) with the following notes: "Species haec vegeta ex integro alba, postice longe resupinato-producta, interdum ex integro resupinata. Sporae hyalinae, subglobosae, $5-6 \times 4-4\frac{1}{2}\ \mu$; hyphae subhymeniale $3\frac{1}{2}-4\frac{1}{2}\ \mu$ latae, septatae." The identity of the two plants is doubtful.

12. CORIOLUS MEMBRANACEUS (Sw.) Pat.

Boletus membranaceus Sw. Prodr. 148. 1788. — Fl. Ind. Occ. **3**: 1922. 1806.

Polyporus membranaceus Fr. Syst. Myc. **1**: 370. 1821. — Berk. Ann. Mag. Nat. Hist. **10**: 378. *pl. 10. f. 7.* 1843.

Polystictus semiplicatus Ell. & Macbr. Iowa Bull. Nat. Hist. **3**: 192. 1896.

Coriolus membranaceus Pat. Tax. Hymén. 94. 1900.

Originally described from plants collected on dead wood in Jamaica as follows:

"B. acaulis gregarius proliferus submembranaceus laevis radiatus albus, poris erosis difformibus."

This description is much enlarged in Swartz's later work. The species is exceedingly abundant in tropical America on all kinds of dead wood and large collections have been brought to the New York Botanical Garden in recent years, as the following list will show:

Porto Rico, *Earle, Underwood & Griggs, Heller, Wilson 39;* New Providence, *E. G. Britton 732;* St. Kitts, *Britton & Cowell 710;* Cuba, *Underwood & Earle 572, 853, 1318, 1374, 1376, 1575, Earle, Wilson, Murrill;* Jamaica, *Earle 232, 525, 601, 611, Underwood 2326, Miss Robinson;* Nicaragua, *Smith;* Colombia, *Baker.*

13. **Coriolus Flabellum** (Mont.)

Polyporus Flabellum Mont. Pl. Cell. Cuba. 388. *pl. 15. f. 2.* 1842.

Well described and finely figured by Montagne from plants collected on dead branches and trunks in Cuba. Types at Paris are well preserved. Although nearly related to *C. pargamenus*, it is quite distinct both in form and habit. It is more difficult to separate it from *C. membranaceus.*

14. **Coriolus planellus** nom. nov.

Polyporus planus Peck, Rep. N. Y. State Mus. Nat. Hist. **31**: 37. 1879. Not *P. planus* Wallr. 1833.

The type plants of this species were collected on dead branches at North Greenbush, New York. Only a few specimens are at hand: New Hampshire, *Blake;* Maine, *Murrill;* Iowa, *Holway.*

15. CORIOLUS ARMENICOLOR (B. & C.) Pat.

Polyporus armenicolor B. & C. Jour. Linn. Soc. Bot. **10**: 315. 1868.

Coriolus armenicolor Pat. Tax. Hymén. 94. 1900.

Described as follows from Wright's Cuban collections:

"Pileo tenui subcoriaceo flabelliformi in stipitem spurium attenuato zonato velutino interstitiis lineatis; hymenio alutaceo; poris minutis, dissepimentis tenuibus dentatis."

"On dead wood. Pileus 2⅓ inches across, 1¾ long; pores $\frac{1}{120}$ inch in diameter. The pileus is of a pale tawny or tan-color, with darker lines. Allied to *P. versicolor.*"

Plants collected by Cockerell in Jamaica in 1890 correspond exactly with Wright's Cuban types at Kew except with respect to the zones of tomentum, which may be variable or evanescent in the species. More material may throw light on this matter.

16. **Coriolus sobrius** (B. & C.)

Polyporus sobrius B. & C. Jour. Linn. Soc. Bot. **10**: 316. 1868.

Described as follows from Wright's collections in Cuba:

"Pileo imbricato flabelliformi opaco glaberrimo subzonato tenui umbrino-cinereo nebuloso; poris parvis laceratis."

"On dead wood. Pileus $\frac{3}{8}$ inch wide, $\frac{5}{8}$ inch long; pores $\frac{1}{81}$ inch in diameter. Somewhat resembling *P. sector*, var. *zonarius*, but, I think, distinct."

The small thin purplish zonate type plants now at Kew appear quite distinct.

17. **Coriolus nigromarginatus** (Schw.)

Boletus hirsutus Wulf. in Jacq. Collect. **2**: 149. 1788. Not *Boletus hirsutus* Scop. Fl. Carn. ed. 2. **2**: 468. 1772.

Boletus nigromarginatus Schw. Syn. Fung. Car. 72. 1818.

Polyporus hirsutus Fr. Syst. Myc. **1**: 367. 1821.

Originally described from plants collected in Carinthia, where Wulfen found it very common on tree trunks in the forests and

sometimes in orchards. His following brief description is accompanied by copious notes:

"Boletus acaulis, semicircularis, plano-convexus, albissimus, supra hirsutissimus, lineis concentricis alternis depressis; subtus poris rotundato-angulatis."

Wulfen's name, however, is preoccupied by Scopoli for the plant usually known as *Polyporus hispidus* Fr. (see Bull. Torrey Club **31**: 594. 1904) and Schweinitz's name must be used for the present species. It was first applied to specimens collected on trunks of *Liriodendron* in North Carolina and afterwards on the same host in Pennsylvania, to which host Schweinitz thought it was confined.

It must be confessed that this form on *Liriodendron* looks distinct when seen in the field, being large and rigid, with short tomentum and a broad black marginal band; but I am convinced that this is an undeveloped stage, deserving possibly varietal, but not specific, distinction. Type plants in the Schweinitz herbarium appear fully developed and not at all unlike ordinary forms on other deciduous trees.

This species is very abundant throughout the United States and Canada on all kinds of decaying deciduous wood, the form on *Liquidambar* especially being very similar to that from the European type locality. In early summer the sporophores make their appearance as very dark brown hairy swellings on decayed wood or the remains of older pilei and grow rapidly into conchate fruit-bodies of tough elastic substance and hirsute surface marked with concentric zones of gray and brown. The hymenium may be yellowish or fuscous and the pores circular or irregular, with thin, dentate dissepiments equaling the thickness of the context in length. No shining glabrous zones make their appearance as is the case with *C. versicolor*.

Specimens too numerous to mention here have been examined from various parts of Europe, Asia and North America.

18. **Coriolus Sullivantii** (Mont.)

Polyporus Sullivantii Mont. Ann. Sci. Nat. Bot. II. **18**: 243. 1842.

Described from plants collected on fallen dead branches in Ohio by Sullivant and sent to Montagne by Asa Gray. Little is

known of the species. Two collections made by Ellis in New York match the types at Kew. The pileus is orbicular to dimidiate, thin, coriaceous, concave beneath, with acute margin and villose, zonate surface. The tubes are unequal, of medium size, a millimeter or more in length, with acute, dentate dissepiments, which become pale fuscous with age. There is little to distinguish it from forms of *C. hirsutus*.

19. CORIOLUS PINSITUS (Fr.) Pat.

Polyporus pinsitus Fr. Elench. Fung. 95. 1828.
Polystictus umbonatus Fr. Nov. Symb. 87. 1851.
Coriolus pinsitus Pat. Tax. Hymén. 94. 1900.

Collected by Lund on trunks of trees in Brazil and described as follows:

"Coriaceo-membranaceus, tenax, pileis hirtis concentrice sulcatis unicoloribus cinereis, poris curtis majusculis angulatis acutis inaequalibus albis."

Later described as *Polystictus umbonatus* from Liebmann's Mexican collections on account of the dark pores seen in these specimens. The hymenium varies from white to purple and smoke-colored in a way calculated to puzzle anyone not accustomed to its changes. Some specimens are half white and half dark beneath.

Few species are more abundant than this in tropical America. It may be found on dead wood of various forms and kinds, such as sticks, stumps and logs of bamboo, logwood, cocoanut, etc., throughout the West Indies and the warmer parts of Central and South America. The following list includes numbers of specimens recently added to the New York Botanical Garden herbarium:

Bolivia, *Rusby;* Ecuador, *Lagerheim*; Brazil, *Henschen, Lund;* Venezuela, *Gaillard;* Nicaragua, *Smith;* Mexico, *Liebmann, Smith;* Cuba, *Wright, Earle, Wilson, Murrill, Underwood & Earle 1117, 1482, 1503, 1509, 1517, Britton & Shafer 469, 473, 558, 774;* Jamaica, *Earle 95, 133, 135, 140, 159b, 231;* Porto Rico, *Goll, Earle 22, 43;* New Providence, *E. G. Britton 722;* Southern Florida, *E. G. Britton 465, Small & Carter 1331.*

20. **Coriolus sericeohirsutus** (Kl.)

Polyporus sericeo-hirsutus Kl. Linnaea **8**: 483. 1833.
Hexagona sericea Fr. Epicr. 497. 1838.

Polystictus barbatulus Fr. Nov. Symb. 87. 1851.

Described by Klotzsch from North American specimens in the Hooker herbarium. The type collection of *Polystictus barbatulus* was made by Curtis in South Carolina on dead trunks of red cedar. Fries separated it from *Hexagona sericea* because of its large pores, not knowing that this species shows wide variation in the form and size of its tubes. The resupinate depauperate form is incorrectly called *Poria superficialis* of Schweinitz in the Fries herbarium.

This plant is distinct, easily recognized and confined to one host, *Juniperus virginiana*, on the dead trunks and branches of which it is quite common in the southern United States north to Virginia and west to Missouri. I have collected it in quantity near Elizabethtown, Tennessee.

Specimens have been examined from South Carolina, *Ravenel;* Georgia, *Ravenel;* Florida, *Rau, Calkins, Lloyd;* Louisiana, *Langlois;* Tennessee, *Murrill 456;* Kentucky, *Miss Price;* Missouri, *Demetrio.*

21. **Coriolus arenicolor** (B. & C.)

Polyporus arenicolor B. & C. Jour. Linn. Soc. Bot. **10**: 315. 1868.

Described as follows from Wright's collections in Cuba:

"Pileo dimidiato postice decurrente papyraceo repetite zonato strigoso velutino, pallido, margine lobato; poris parvis angulatis, dissepimentis tenuibus; hymenio ochraceo."

"On logs in woods. Pileus 3 inches wide, 1¼ long. Pores $\frac{1}{100}$ inch across. Allied to *P. pinsitus* rather than to *P. hirsutus.*"

This is a very abundant species throughout the West Indies, on dead sticks and logs of various broad-leaved trees. It has been confused with *C. velutinus* and with *C. haedinus*, from both of which it is quite distinct. Material is at hand from the following localities:

Cuba, *Earle, Wilson, Pollard, Murrill, Underwood & Earle 379, 571, 763, 1503;* Haiti, *Nash 25;* Jamaica, *Earle 24, 48, 60, 92, 138, 157, 159a, 336, 340, 486;* New Providence, *E. G. Britton 245, 730;* Southern Florida, *Small & Carter 1322.*

22. **Coriolus hirtellus** (Fr.)

Polystictus hirtellus Fr. Nov. Symb. 83. 1851.

Collected on trunks of trees in Mexico by Liebmann and described as follows:

"Pileo stuppeo-coriaceo effuso-reflexo, pilis subtilibus erectis strigosis hirtulo, primitus azono, demum versus marginem obsolete et concolori-sulcato, contextu albido, poris mediis rotundis angulatisque helvelo-pallidis, demum fuscescentibus."

The types are poorly preserved and difficult to distinguish from old plants of *C. nigromarginatus* or *Coriolopsis occidentalis*.

23. **Coriolus tener** (Lév.)

Polyporus tener Lév. Ann. Sci. Nat. Bot. III. **5**: 139. 1846.

Described from plants collected on trunks in Guadeloupe by L'Herminier as follows:

"Pileo coriaceo reflexo membranaceo sessili orbiculari zonato hirsuto albo, margine ancipiti subtus sterili, poris hexagonis ore acutis intus extusque alutaceis, contextu albo."

"Chapeau quelquefois résupiné, mais le plus ordinairement réfléchi, large de 2 ou 3 centimètres, membraneux, flexible, à surface blanche, tomenteuse; pores d'un jaune tendre."

The types are at Paris. Very little is known of the species, though it appears distinct.

24. CORIOLUS BIFORMIS (Kl.) Pat.

Polyporus biformis Kl. Linnaea **8**: 486. 1833.
Polyporus molliusculus Berk. Lond. Jour. Bot. **6**: 320. 1847.
Polyporus carolinensis Berk. Hook. Jour. Bot. **1**: 102. 1849.
Polyporus chartaceus Berk. Hook. Jour. Bot. **1**: 103. 1849. — Grevillea **1**: 53. 1872.
Coriolus biformis Pat. Tax. Hymén. 94. 1900.

Originally described from specimens collected by Dr. Richardson on birch in North America as follows:

"Pileo effuso-reflexo coriaceo villoso candido zonato, poris mediis dentatis albidis. Imbricatus. Pileus 2–4 unc. latus, 1–2 unc. longus. Pori irregulares, interdum fusco-violascentes."

Polyporus molliusculus was described from Lea's collections in Ohio, *P. carolinensis* from plants collected by Curtis on oak and *Liquidambar* in South Carolina and *P. chartaceus* from specimens found by Curtis in North Carolina on the under side of fallen trunks and branches of *Liriodendron*. According to Berkeley and Curtis, *Irpex epiphylla* Schw. is also a synonym.

This species is common, widely distributed and conspicuous on various forms of dead deciduous wood throughout North America, being usually referred to by collectors under its earliest name, with *P. carolinensis* and *P. chartaceus* as synonyms. *P.*

molliusculus is here thrown into synonymy only after a careful examination of the original specimens, which fully warrant this disposition of a troublesome name.

Specimens are at hand from Canada, *Dearness;* New Hampshire, *Miss Minns;* New York, *Murrill;* New Jersey, *Ellis;* Delaware, *Commons;* Pennsylvania, *Barbour;* West Virginia, *Nuttall;* Florida, *Calkins;* Alabama, *Benson, Underwood, Earle;* Louisiana, *Langlois;* Ohio, *Lloyd;* Missouri, *Demetrio;* Kansas, *Cragin;* Iowa, *Macbride.*

25. CORIOLUS ABIETINUS (Dicks.) Quél.

Boletus abietinus Dicks. Pl. Crypt. Brit. **3**: 21. *pl. 9. f. 9.* 1793.
Boletus incarnatus Schum. Enum. Pl. Saell. **2**: 391. 1803.
Coriolus abietinus Quél. Ench. Fung. 175. 1886.

A good description of this plant is to be found in the Magazin für Botanik **12**: 19. 1790, presumably written by Schrank, but I hesitate to ascribe the species to him on the basis of this citation. It seems quite certain that *Sistotrema fuscoviolaceum* Pers. is a form of the present species; and, according to Bresadola, *P. caesioalbus* Karst. is not specifically distinct.

This species has been well known for a long time by reason of its abundance throughout the northern hemisphere on decaying wood of coniferous trees, none of which appear to be exempt from its attack. Of the large number of specimens examined, the following may be mentioned:

Finland, *Karsten;* Tyrol, *Bresadola;* Newfoundland, *Waghorne;* Canada, *Macoun;* New York, *Shear, Underwood, Peck;* New Jersey, *Ellis;* South Carolina, *Ravenel;* Georgia, *Harper;* Alabama, *Mell;* Cuba, *Underwood & Earle 1337;* Texas, *Ravenel;* California, *McClatchie;* Colorado, *Bethel.*

26. CORIOLUS PARGAMENUS (Fr.) Pat.

Polyporus parvulus Schw. Trans. Am. Phil. Soc. **4**: 157. 1834.
Not *P. parvulus* Kl. Linnaea **8**: 483. 1833.
Polyporus pargamenus Fr. Epicr. 480. 1838.
Polyporus laceratus Berk. Ann. Mag. Nat. Hist. **3**: 392. 1839.
Polyporus Menandianus Mont. Ann. Sci. Nat. Bot. II. **20**: 362. 1843.

Polyporus xalapensis Berk. Hook. Jour. Bot. **1**: 103. 1849.
Polyporus balsameus Peck, Rep. N. Y. State Mus. Nat. Hist. **30**: 46. 1878.
Polyporus pseudopargamenus Thüm. Myc. Univ. no. 1102.
Polystictus Pusio Sacc. & Cub. in Sacc. Sylloge Fung. **6**: 265. 1888.
Coriolus pargamenus Pat. Tax. Hymén. 94. 1900.

Originally described under the name in current use from specimens collected by the Franklin expedition on trunks of pine in arctic North America. A year or two later Berkeley described it from New Orleans, Louisiana, under the name of *Polyporus laceratus;* then Montagne found it among Menand's New York collections and gave it the name of the collector. If the form on conifers is specifically distinct from that on deciduous wood, then *Polyporus balsameus* Peck is a synonym of *P. parvulus* Schw. and *P. pargamenus* Fr., while *P. laceratus* holds for the form on oak, chestnut, etc. After examining growing specimens of both forms, however, I think it best to consider them specifically the same.

The above list does not complete the synonyms of this variable plant. According to Bresadola, *Polyporus dispar* Kalchbr. and *Polyporus simulans* Blonski should be added for the European forms; while there are probably half a dozen more from other regions. Specimens from North America have been variously determined as *P. elongatus* Berk., described from Manila, *P. nilgheriensis* Mont., described from India, and *Daedalea ferruginea* Schum., described from Denmark.

This species occurs in great abundance in North America on dead wood of oak, cherry, birch, chestnut, maple and other deciduous trees, often covering the sides of dead standing or fallen trunks, especially those of white oak, for almost their entire length. It is also found on pine, hemlock, fir, etc., especially in the northern forests where these trees abound, the typical host of both the Schweinitzian and Friesian plants having been a pine trunk.

It also occurs in Europe, where it appears to have been recognized only recently under its Friesian name. Bresadola reports it common in Hungary on poplar, oak and basswood and considers it cosmoplitan in one or more of its multiplied forms.

The following list of specimens examined is much abbreviated and deals almost wholly with American material: Maine, *Ricker, Murrill, Miss White;* Connecticut, *Miss White;* New York, *Peck, Underwood, Clinton, Murrill;* New Jersey, *Ellis, Britton, Murrill;* Delaware, *Commons;* Pennsylvania, *Stevenson, Barbour, Sumstine, Murrill;* Virginia, *Murrill;* South Carolina, *Ravenel;* Georgia, *Harper;* Florida, *Nash;* Louisiana, *Langlois;* Tennessee, *Murrill;* Wisconsin, *Baker;* Hungary, *Kmet.*

SPECIES INQUIRENDAE

Polyporus arcticus Fr. Epicr. 479. 1838.
Boletus cervinus Schw. Synop. Fung. Car. 70. 1818.
Boletus cinerascens Schw. Synop. Fung. Car. 73. 1818.
Polystictus cyphelloides Fr. Nov. Symb. 88. 1851.
Polyporus decipiens Schw. Trans. Am. Phil. Soc. **4**: 157. 1834.
Polystictus deglubens Cookè, in Sacc. Syll. Fung. **6**: 290. 1888.
Polyporus Friesii Kl. Linnaea **8**: 487. *pl. 11.* 1833.
Polystictus jamaicensis Henn. Hedwigia **37**: 280. 1898.
Polyporus Kickxianus Lév. Ann. Sci. Nat. Bot. III. **9**: 122. 1848.
Polystictus limitatus B. & C. Grevillea **1**: 54. 1872.
Polystictus nuceus Fr. Nov. Symb. 81. 1851.
Polyporus papyraceus Fr. Elench. Fung. 97. 1828.
Polystictus placentaeformis Cooke, Grevillea **15**: 24. 1886.
Polystictus Ravenelii Berk. & Fr. Nov. Symb. 82. 1851.
Polyporus Richardsonii B. & C. Jour. Acad. Sci. Phila. II. **3**: 224. 1856.
Polyporus scarrosus B. & C. Grevillea **1**: 52. 1872.
Polyporus subflavus Lév. Ann. Sci. Nat. Bot. III. **5**: 300. 1846.

NEW YORK BOTANICAL GARDEN.

Astragalus and its segregates as represented in Colorado

Per Axel Rydberg

Linnaeus had two genera, *Astragalus* and *Phaca*, the former with a 2-celled, coriaceous or membranous pod and the latter with a 1-celled, papery pod. As more species have become known these characters do not hold, as there are many species which have the pods partly 2-celled, and the texture of both the 1-celled and 2-celled pods varies. The only reasonable ways to treat these two genera, are to merge them into one or to divide them into several. The latter was tried by Torrey and Gray in their flora. When still more species became known, Dr. Gray saw that he had to propose a number of genera in order to be consistent, gave the method up, and merged all the species into *Astragalus*. He was followed by Dr. Watson. In the Old World the segregation was begun by Medicus, and continued by Opiz, Fourreau and Steven. The latter proposed not less than 24 new genera. It seems that these should cover all the forms that have been included in *Astragalus*, but this is not the case. In the Old World, the completely 2-celled series is best represented, but in America the 1-celled or incompletely 2-celled forms are predominant. The segregation into several genera was renewed in Dr. Britton's Manual and carried somewhat further in Dr. Small's. The Colorado genera and species may be disposed as follows:

Key to the genera

Leaves pinnate or unifoliolate.
  Pods 2-celled, with a perfect partition.
    Pods fleshy, indehiscent or very tardily dehiscent. 1. Geoprumnon.
    Pods membranous, leathery or woody, dehiscent.
      Pods not inflated.
        Pods ovoid or oblong, rarely almost didymous, terete or flattened vertically, leathery or woody. 2. Astragalus.
        Pods linear, more or less flattened laterally, membranous. 3. Hamosa.
      Pods strongly inflated, papery. 4. Cystium.
  Pods 1-celled, the partition, if any, rudimentary.
    Lower suture strongly intruded, making the pod sagittate or obcordate in cross-section; pods membranous, rarely leathery. 5. Tium.

Lower suture not intruded or merely slightly so; pods in the latter case woody.
Pods strongly inflated, papery. 14. PHACA.
Pods not inflated, or slightly so, membranous to woody.
Pods with a partial partition, formed by the inflexion of the lower suture.
Pods membranous. 6. ATELOPHRAGMA.
Pods woody.
Pods stipitate; leaves unifoliolate. 7. JONESIELLA.
Pods sessile; leaves pinnate.
Calyx-tube short, campanulate, equaling or shorter than the lobes; tall glabrous plants. 8. PHACOPSIS.
Calyx-tube cylindrical, longer than the lobes; low, cespitose, cinerous or villous plants. 9. XYLOPHACOS.
Pods without a vestige of a partition.
Pods not with two grooves on the upper side (or, if slightly grooved, sessile).
Pods with a fleshy epicarp, in fruit cross-ribbed; leaflets obscurely articulated to the rachis, fleshy, narrow. 10. CTENOPHYLLUM.
Pods without fleshy epicarp; leaflets distinctly articulated to the rachis.
Pods woody or at least leathery, flattened or slightly intruded on the lower side.
Calyx cylindrical; flowers large; plant mostly low and cespitose. 9. XYLOPHACOS.
Calyx campanulate; flowers small.
Corolla yellow; calyx-lobes linear-lanceolate, equaling the tube; stipules united; stem low. 12. CNEMIDOPHACOS.
Corolla purple; calyx-lobes triangular, much shorter than the tube; stipules free or nearly so; stem tall and slender. 11. MICROPHACOS.
Pods membranous, usually more or less flattened laterally, with both sutures prominent.
Leaves spinulose-tipped; pods 1–2-seeded. 15. KENTROPHYTA.
Leaves not spinulose-tipped; pods several- to many-seeded. 16. HOMALOBUS.
Pods with two grooves on the upper side, stipitate. 13. DIHOLCOS.
Leaves digitately trifoliate. 17. OROPHACA.

1. GEOPRUMNON Rydb.; Small, Fl. SE. U. S. 615. 1903.

Besides by the type, *G. crassicarpum* (Nutt.) Rydb., the genus is represented by:

Geoprumnon succulentum (Richardson) Rydb.
Astragalus succulentus Richardson, Franklin Journey 746. 1823.
Astragalus prunifer Rydb. Mem. N. Y. Bot. Gard. 1: 239. 1900.

2. ASTRAGALUS L. Sp. Pl. 755. 1753.

As the type, I regard *A. christianus* L., which was an article of food in the desert regions of Syria and the Holy Land. The

genus is represented in Colorado by: *A. mollissimus* Torr., *A. Bigelowii* A. Gray, *A. anisus* Jones, *A. canadensis* L., *A. coloradensis* Rydb., *A. nitidus* Dougl. (*A. adsurgens* Hook.; not Pall.), *A. sulphurescens* Rydb., *A. virgultatus* Sheld. and *A. goniatus* Nutt.

3. HAMOSA Medic. Vorles. Churpf. Phys. Ges. **2**: 376. 1787.

The type of this genus was *Astragalus hamosus* L. To it belongs, beside *H. Nuttalliana* (DC.) Rydb. and *H. leptocarpa* (T. & G.) Rydb. already named, also the following:

Hamosa scaposa (A. Gray) Rydb.
Astraglus scaposus A. Gray Proc. Am. Acad. **13**: 366. 1878.

4. CYSTIUM Stev. Bull. Soc. Nat. Mosc. **4**: 268. 1832.

This genus was based on *Astragalus Cicer* L., *A. Pallasii* Sprengel and *A. physodes* L. Congeneric with these are:

Cystium diphysum (A. Gray) Rydb.
Astragalus diphysus A. Gray, Pl. Fendl. 34. 1849.
Cystium ineptum (A. Gray) Rydb.
Astragalus inceptus A. Gray, Proc. Am. Acad. **6**: 525. 1865.

5. TIUM Medic. Vorles. Churpf. Phys. Ges. **2**: 373. 1787.

This was based on *Astragalus sulcatus* L. The typical Colorado species of this genus are:

Tium Drummondii (Dougl.) Rydb.
Astragalus Drummondii Dougl.; Hook. Fl. Bor. Am. **1**: 153. 1831.
Tium racemosum (Pursh) Rydb.
Astragalus racemosus Pursh, Fl. Am. Sept. 740. 1814.
Tium scopulorum (Porter) Rydb.
Astragalus scopulorum Porter, in Porter & Coult. Syn. Fl. Colo. 24. 1874.

I refer to it also the following, which although not closely related to the type fit better in this genus than in any other:

Tium alpinum (L.) Rydb.
Astragalus alpinus L. Sp. Pl. 760. 1753.

Tium sparsiflorum (A. Gray) Rydb.
Astragalus sparsiflorus A. Gray, Proc. Acad. Phila. **1863**: 60, hyponym. 1863. — Proc. Am. Acad. **6**: 205. 1863.
Tium huministratum (A. Gray) Rydb.
Astragalus huministratus A. Gray, Pl. Wright. **2**: 43. 1843.
Tium desperatum (Jones) Rydb.
Astragalus desperatus Jones, Zoe **2**: 243. 1891.

6. **Atelophragma** Rydb. gen. nov.

Caulescent leafy slender herbs with rootstocks. Stipules nearly free both from each other and from the petioles. Leaves pinnate, usually with numerous leaflets. Inflorescence a spike-like raceme. Calyx short, campanulate; lobes slender, subulate. Corolla white or purplish. Pod membranous or papery, more or less compressed laterally, in the typical species decidedly flattened and stipitate; dorsal suture intruding in the pod and forming a partial partition.

The first species below is to be regarded as the type.

Atelophragma aboriginum (Richardson) Rydb.
Astragalus aboriginorum Richardson, Frankl. Journey 746. 1823.
Atelophragma Macounii Rydb.
Astragalus Macounii Rydb. Mem. N. Y. Bot. Gard. **1**: 243. 1900.
Atelophragma glabriuscula (A. Gray) Rydb.
Astragalus glabriusculus A. Gray, Proc. Am. Acad. **6**: 204. 1863.

The following species, although having sessile and more turgid pods, may be included also in the genus:

Atelophragma elegans (Hook.) Rydb.
Phaca elegans Hook. Fl. Bor. Am. **1**: 144. 1831.
Astragalus oroboides americanus A. Gray, Proc. Am. Acad. **6**: 205. 1863.
Atelophragma Brandegei (Porter) Rydb.
Astragalus Brandegei Porter, in Porter & Coult. Syn. Fl. Colo. 24. 1874.
Atelophragma Shearis Rydb.
Astragalus Shearis Rydb. Bull. Torrey Club **31**: 562. 1904.

7. **Jonesiella** Rydb. gen nov.

Stout perennial with a woody root and simple stems. Leaves unifoliolate, thick and veiny; stipules broadly triangular, thin. Racemes 6–8-flowered, axillary. Calyx cylindric, somewhat gibbous, with triangular teeth. Corolla ochroleucous with a purple spot on the keel. Pod stipitate, coriaceous, elliptic, turgid, partially 2-celled by the inflexion of the upper suture.

Jonesiella asclepiadoides (Jones) Rydb.

Astragalus asclepiadoides Jones, Zoe **2**: 238. 1891.

8. **Phacopsis** Rydb. gen. nov.

Stout erect glabrous perennials, more or less branched at the woody base. Leaves pinnate with numerous leaflets; stipules ovate, almost free. Racemes rather many-flowered; flowers nearly sessile; bracts lanceolate. Calyx campanulate; lobes lanceolate-subulate, nearly equaling the tube, at last with spreading tips. Corolla ochroleucous with purple-tipped keel; banner and wings narrow. Pod oblong-ovate, coriaceous, somewhat inflated, with a more or less distinct partial partition formed by the inflexion of the suture.

The first species is to be regarded as the type.

Phacopsis praelongus (Sheld.) Rydb.

Astragalus procerus A. Gray, Proc. Am. Acad. **13**: 369. 1878. Not *A. procerus* Boiss. & Haussk. 1872.

Astragalus praelongus Sheld. Bull. Geol. & Nat. Hist. Surv. Minn. **9**: 23. 1894.

Phacopsis Pattersoni (A. Gray) Rydb.

Astragalus Pattersoni A. Gray in Brandegee, Bull. U. S. Geol. Surv. Terr. **2**: 235. 1876.

Gray, Watson and Sheldon associated *A. Pattersonii* with *A. Fendleri* and *A. Hallii*, but the pod is practically that of *Xylophacos*, *i. e.*, *A. Shortianus* and its allies, but shorter and more inflated. It has a partial partition, although not so prominent as in the preceding. These two species might have been included in *Xylophacos*, but they have a different habit and different calyx.

9. XYLOPHACOS Rydb.; Small, Fl. SE. U. S. 619. 1903.

Besides the type, *X. Shortianus* (Nutt.) Rydb., and *X. missouriensis* (Nutt.) Rydb., the following are found in Colorado:

Xylophacos vespertinus (Sheld.) Rydb.
Astragalus vespertinus Sheld. Bull. Geol. & Nat. Hist. Surv. Minn. **9**: 150. 1894.

Xylophacos amphioxus (A. Gray) Rydb.
Astragalus amphioxus A. Gray, Proc. Am. Acad. **13**: 366. 1878.

Xylophacos uintensis (Jones) Rydb.
Astragalus uintensis Jones, Proc. Calif. Acad. II. **5**: 670. 1895.

Xylophacos pygmaeus (Nutt.) Rydb.
Phaca pygmaea Nutt.; T. & G. Fl. N. Am. **1**: 349. 1838.
Astragalus chamaeluce A. Gray, Bot. Ives' Rep. 10. 1861.
Astragalus Cicadae Jones, Zoe **4**: 35. 1893.

This is somewhat aberrent from the typical species of *Xylophacos*, as its pod is spongy at maturity.

Xylophacos Parryi (A. Gray) Rydb.
Astragalus Parryi A. Gray, Am. Jour. Sci. II. **33**: 409. 1862.

Also somewhat aberrent on account of its long pod inflexed on both sutures, and in this respect approaching the genus *Holcophacos*.

Xylophacos Purshii (Dougl.) Rydb.
Astragalus Purshii Dougl.; Hook. Fl. Bor. Am. **1**: 152. 1831.

Torrey, Gray, Watson and Sheldon placed this species and its allies in the subgenus *Phaca*, while *Astragalus Shortianus* and its closer relatives were placed in *Astragalus* proper. There is only one character to separate the two groups, viz., the long woolly pubescence on the pods in one and the sparse and usually appressed pubescence in the other. Some of the *A. Purshii* relatives have the sutures just as much inflexed as any of the other group. The habit, calyx, etc., are practically the same in both.

Xylophacos Newberryi (A. Gray) Rydb.
Astragalus Newberryi A. Gray, Proc. Am. Acad. **12**: 55. 1876.

Watson placed this in the subgenus *Phaca*, in the same section as *A. Fendleri*, *A. Hallii* and *A. flexuosus*. Scarcely a worse place could have been chosen. The structure of the pod and its pubescence associate it with the preceding and its allies, while the habit is more like a dwarf form of the *A. Shortianus* group.

10. **Ctenophyllum** Rydb. gen. nov.

Stout perennials with often several stems rising from the same root and more or less stoloniferous. Leaves pinnate, with 11–19 linear to filiform leaflets, which are very indistinctly jointed to the rachis; stipules ovate, free from the petioles, but (especially the lower) united back of the stem. Peduncles usually equaling the leaves; raceme short. Calyx cylindro-campanulate, very gibbous at the base on the upper side. Corolla ochroleucous, with narrow petals; keel almost straight. Pod oblong, terete, coriaceous with a subfleshy epicarp, in age cross-wrinkled, with thick and prominent sutures, neither of which is inflexed.

Ctenophyllum pectinatum (Hook.) Rydb.

Phaca pectinata Hook. Fl. Bor. Am. **1**: 141. 1831.

Astragalus pectinatus Dougl.; Hook. *loc. cit.* 142, as a synonym.

11. **Microphacos** Rydb. gen. nov.

Subcinereous perennials with very slender stems. Leaves pinnate with 11–17 linear to oblong leaflets; stipules very broad, triangular, free from the petioles and only the lower more or less united with each other. Racemes many-flowered. Calyx short-campanulate, about 2 mm. long, with very short and broad teeth. Corolla purple, 5–6 mm. long, all petals strongly curved. Pod 6–8 mm. long, coriaceous, cross-wrinkled, wholly 1-celled, 6–7-ovuled, boat-shaped, *i. e.*, lower suture prominent, strongly curved, upper suture nearly straight or curved upwards, flat or slightly sulcate.

The first species is to be regarded as the type.

Microphacos gracilis (Nutt.) Rydb.

Astragalus gracilis Nutt. Gen. **2**: 100. 1818.

Microphacos microlobus (A. Gray) Rydb.

Astragalus microlobus A. Gray, Proc. Am. Acad. **6**: 203. 1863.

12. **Cnemidophacos** Rydb. gen. nov.

Cespitose perennials with a woody caudex; stems short, 1–2 dm. high. Leaves pinnate with many narrow leaflets, cinereous; stipules slightly united with the petioles, but almost wholly united behind the stem forming a sheath. Racemes strict and many-flowered. Calyx deeply campanulate; lobes linear-lanceolate, equaling the tube. Corolla yellow, with narrow petals. Pod coriaceous, oblong-ovoid, rounded below, somewhat depressed above, but with a very sharp suture and hence somewhat 2-grooved.

Cnemidophacos flavus (Nutt.) Rydb.
Astragalus flavus Nutt. in T. & G. Fl. N. Am. **1**: 335. 1838.
Tragacantha flaviflora Kuntze, Rev. Gen. Pl. **2**: 941. 1891.
Astragalus flaviflorus Sheld. Bull. Geol. & Nat. Hist. Surv. Minn. **9**: 158. 1894.

This has been placed in the *Eu-Astragalus* division, next after *A. racemosus*, and in a section together with *A. huministratus* and *A. oreganus*, to which it has no relationship. The only similarity is the conspicuousness of the stipules.

13. **Diholcos** Rydb. gen. nov.

Stout erect perennials often forming clumps. Leaves pinnate with many thick leaflets; stipules lanceolate, free. Raceme many-flowered, dense, spike-like; bracts lance-subulate. Calyx campanulate, gibbous at the base on the upper side; teeth subulate-setaceous. Corolla purple, white or ochroleucous; petals only moderately curved and blunt. Pod coriaceous, stipitate, oblong, straight, rounded on the lower suture, deeply 2-grooved above and with a prominent upper suture, 1-celled.

The first species is to be regarded as the type.

Diholcos bisulcatus (Hook.) Rydb.
Phaca bisulcata Hook. Fl. Bor. Am. **1**: 145. 1831.
Astragalus bisulcatus A. Gray, Pac. R. R. Rep. **12**: 42. 1860.
Diholcos decalvans (Gandoger) Rydb.
Astragalus bisulcatus decalvans Gandoger, Bull. Soc. Bot. France **48**: xv. 1902.
Diholcos Haydenianus (A. Gray) Rydb.
Astragalus Haydenianus A. Gray in Brandegee, Bull. U. S. Geol. Surv. Terr. **2**: 235. 1876.

14. PHACA L. Sp. Pl. 755. 1753.

The Colorado species are as follows: *Phaca longifolia* (Pursh) Nutt., *P. picta* A. Gray, *P. Candolleana* H. B. K., *P. pauciflora* Nutt., and:

Phaca Eastwoodiae (Jones) Rydb.
Astragalus Preussii sulcatus Jones, Zoe **4**: 37. 1893.
Astragalus Eastwoodiae Jones, Zoe **4**: 368. 1894.
Phaca artipes (A. Gray) Rydb.
Astragalus artipes A. Gray, Proc. Am. Acad. **13**: 370. 1878.

Phaca cerussata (Sheld.) Rydb.
Astragalus cerussatus Sheld. Bull. Geol. & Nat. Hist. Surv. Minn. **9**: 139. 1894.
Phaca Bodinii (Sheld.) Rydb.
Astragalus Bodinii Sheld. Bull. Geol. & Nat. Hist. Surv. Minn. **9**: 122. 1894.

Sheldon placed this among the *Homalobi* and described the pod as being flat, but all specimens with well-developed fruit show that the species is a typical *Phaca*.

Phaca humillima (A. Gray) Rydb.
Astragalus humillimus A. Gray, in Brandegee, Bull. U. S. Geol. Surv. Terr. **2**: 235. 1876.
Phaca elatiocarpa (Sheld.) Rydb.
Astragalus lotiflorus brachypus A. Gray, Proc. Am. Acad. **6**: 209. 1863.
Astragalus elatiocarpus Sheld. Bull. Geol. & Nat. Hist. Surv. Minn. **9**: 20. 1894.
Phaca Wetherillii (Jones) Rydb.
Astragalus Wetherillii Jones, Zoe **4**: 34. 1893.

15. KENTROPHYTA Nutt. in T. & G. Fl. N. Am. **1**: 353. 1838.

Besides the *K. viridis* Nutt., the following are found in Colorado:

Kentrophyta impensa (Sheld.) Rydb.
Astragalus Kentrophyta elatus S. Wats. Bot. King's Expl. 77. 1871. Not *A. elatus* Boiss. & Bal. 1849.
Astragalus viridis impensus Sheld. Bull. Geol. & Nat. Hist. Surv. Minn. **9**: 118. 1894.
Kentrophyta Wolfii Rydb.
Homalobus Wolfii Rydb. Bull. Torrey Club **31**: 562. 1904.
Kentrophyta aculeata (A. Nelson) Rydb.
Astragalus tegetarius implexus Canby, in Porter & Coult Colo. Add. (no page-number) 1874.
Astragalus aculeatus A. Nelson, Bull. Torrey Club **26**: 10. 1899.

16. HOMALOBUS Nutt. in T. & G. Fl. N. Am. **1**: 350. 1838.

The following are the Colorado species: *H. caespitosus* Nutt., *H. wingatanus* (S. Wats.) Rydb.; *H. Clementis* Rydb., *H. tenellus* (Pursh) Britton, *H. campestris* Nutt., *H. decurrens* Rydb., *H. hylophilus* Rydb., *H. tenuifolius* Nutt. and *H. decumbens* Nutt. Also:

Homalobus grallator (S. Wats.) Rydb.
Astragalus grallator S. Wats. Zoe **3**: 52. 1892.
Homalobus acerbus (Sheld.) Rydb.
Astragalus acerbus Sheld. Bull. Geol. & Nat. Hist. Surv. Minn. **9**: 123. 1894.
Homalobus junciformis (A. Nelson) Rydb.
Astragalus junciformis A. Nelson, Bull. Torrey Club **26**: 9. 1899.
Homalobus camporum Rydb. sp. nov.

A cespitose perennial; stems erect, 1–2 dm. high, grayish-strigose; leaves 3–5 cm. long; leaflets 9–15, linear to nearly filiform, rarely oblong, 4–10 mm. long, 0.5–2 mm. wide, silvery-canescent; stipules ovate, somewhat scarious, strigose; raceme 5–10 cm. long; flowers 7–15; bracts subulate; calyx campanulate, white-silky, about 3 mm. long; lobes lance-subulate, about ⅔ as long as the tube; banner about 6 mm. long, white or ochroleucous with purple veins; keel with a narrow purple tip; pod linear, 12–18 mm. long, 2–3 mm. wide, compressed, straight, strigose.

This is rather common on the plains and hills from Alberta to Colorado and Utah and has been known as *Astragalus campestris*, *A. decumbens* and *A. tenuifolius* Nutt. The first of these is a taller plant 3–4 dm. high, more simple; its pod is 2–2.5 cm. long and its keel is broad and blunt. *H. decumbens* has an arcuate pod and in *H. tenuifolius* the calyx-teeth are triangular and only ¼–⅓ as long as the tube. As the type may be assigned:

WYOMING: Bush Ranch, Sweetwater Co., June 10, 1900, *Aven Nelson 7085*.

Homalobus flexuosus (Hook.) Rydb.
Phaca flexuosa Hook. Fl. Bor. Am. **1**: 141. 1831.
Astragalus flexuosus Dougl.; Hook. *loc. cit.*, as a synonym.

This and the following differ from the typical species of *Homalobus* in having almost terete instead of flattened pods. The pods are, however, of the same texture, wholly one-celled and with prominent sutures, and the plants are of the same general habit.

Homalobus Hallii (A. Gray) Rydb.

Astragalus Hallii A. Gray, Proc. Am. Acad. **6**: 224. 1863.

Homalobus Fendleri (A. Gray) Rydb.

Astragalus Fendleri A. Gray, Pl. Wright. **2**: 44. 1853.

Homalobus proximus Rydb. sp. nov.

Cespitose perennial, related to *H. flexuosus*; stems erect, 2–3 dm. high, grayish-strigose; leaves 4–6 cm. long; stipules triangular-ovate, glabrous; leaflets 5–11, linear or linear-oblong, obtuse, 5–11 mm. long, 1–2 mm. wide, grayish-strigose; racemes erect, 5–10 cm. long; calyx about 2.5 mm. long, strigose; corolla 4–5 mm. long, white or ochroleucous; pod oblong-linear, terete, glabrous, about 12 mm. long and 3 mm. in diameter, glabrous, acute at the apex, abruptly contracted into a short stipe about equaling the calyx.

COLORADO: Arboles, June, 1899, *C. F. Baker 421*.

Homalobus Salidae Rydb. sp. nov.

Decumbent or ascending perennial; stem 3 dm. or more long; leaves 5–7 cm. long; stipules triangular-ovate, strigose; leaflets 15–21, oblong-oblanceolate to narrowly linear, 8–15 mm. long, 0.5–3 mm. wide, strigose; racemes 10–15 cm. long, lax; pedicels 5 mm. long; bracts minute; calyx campanulate, strigose and slightly black-hairy, about 3 mm. long; teeth short, triangular; corolla about 8 mm. long, purple-veined; pod narrowly linear-oblanceolate, terete or nearly so, 2–2.5 cm. long, 2 mm. in diameter, finely strigose, very acute at the apex and gradually tapering into a short stipe below.

COLORADO: Salida, August 3, 1896, *C. L. Shear 3468*.

Homalobus macrocarpus (A. Gray) Rydb.

Phaca macrocarpa A. Gray, Pl. Fendl. 36. 1849.

Astragalus lonchocarpus Torr. Pac. R. R. Rep. **4**: 80. 1856.

This species is doubtfully referred to *Homalobus*. It may represent a monotypic genus of its own. The relationship is however much closer to *Homalobus* than to *Phaca*, with which it has been associated.

17. OROPHACA (T. & G.) Britton, Man. 555. 1901.

Besides *O. sericea* (Nutt.) Britton, the following are found in Colorado:

Orophaca tridactylica (A. Gray) Rydb.
Astragalus tridactylicus A. Gray, Proc. Am. Acad. **6**: 527. 1866.
Orophaca aretioides (Jones) Rydb.
Astragalus sericoleucus aretioides Jones, Cont. West. Bot. **8**: 13. 1898.

NEW YORK BOTANICAL GARDEN.

INDEX TO AMERICAN BOTANICAL LITERATURE

(1904)

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in its broadest sense.

Reviews, and papers which relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omission their kindness will be appreciated.

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Alexander, S. Some interesting Michigan plants; possibly some new species. Ann. Rep. Mich. Acad. Sci. **6**: 88, 89. 1904.

Arthur, J. C. Revised list of Indiana plant rusts. Proc. Ind. Acad. Sci. **1903**: 141–152. 1904.

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Chodat, R. & Hassler, E. Plantae Hasslerianae soit énumération des plantes récoltées au Paraguay. Bull. Herb. Boissier II. **5**: 65–90. 31 D 1904.

Includes new species in *Ionidium, Oxalis, Adenocalymna, Anemopaegma, Mansoa, Macfadyena, Tecoma* and *Abutilon.*

Christ, H. Primitiae florae costaricensis. *Filices* et *Lycopodiaceae* III. Bull. Herb. Boissier II. **5**: 1–16. 31 D 1904. [Illust.]

Includes new species in *Polypodium* (7), *Elaphoglossum* (2), *Antrophyum* (2) and *Gleichenia* (4).

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Greene, E. L. Certain polygonaceous genera. Leaflets **1**: 17–32. 5 Ja 1904; 33–48. 12 Mr 1904; 49, 50. 25 Au 1904.

Includes descriptions of new species in *Bistorta* (6) and *Persicaria* (41), and one new genus, *Duravia* (S. Wats.).

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With 5 new genera and 7 new species.

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